

WHAT IS CLAIMED IS:

1. An optical pickup device driven by an error signal comprising:

a grating element for receiving a light beam to create zero order diffracted light,  $\pm$  first order diffracted light and  $\pm$  second order diffracted light when the light beam passes through the grating element;

an optical system for focusing the zero order,  $\pm$  first order and  $\pm$  second order diffracted light on a recording surface of an optical recording medium so as to form a spot of the zero order diffracted light on a first track extending on the recording surface, spots of the  $\pm$  second order diffracted light on tracks adjacent to the first track, and spots of the  $\pm$  first order diffracted light between the spot of the zero order diffracted light and the spots of the  $\pm$  second order diffracted light; and

an optical detector having first to fifth independent light-receiving elements, the first light-receiving element being adapted to receive returning light from the spot of the zero order diffracted light, the second and third light-receiving elements being adapted to receive returning light from the spots of the  $\pm$  first order diffracted light, and the fourth and fifth light-receiving elements being adapted to receive returning light from the spots of the  $\pm$  second order diffracted light, to produce output signals used to create an error signal.

2. The optical pickup device of claim 1, wherein the first light-receiving element includes four independent

light-receiving portions adjacent to each other and partitioned by two division lines intersecting each other perpendicularly, one of the division lines being parallel to a track extending direction.

3. The optical pickup device of claim 1, wherein each of the second to fifth light-receiving elements includes at least two independent light-receiving portions adjacent to each other and partitioned by a division line extending substantially parallel to a track extending direction.

4. The optical pickup device of claim 1 further including:

a first tracking error signal calculation circuit connected with the first light-receiving element for creating a first tracking error signal based on the output signal from the first light-receiving element;

a second tracking error signal calculation circuit connected with the first to third light-receiving elements for creating a second tracking error signal based on the output signals from the first to third light-receiving elements; and

a third tracking error signal calculation circuit connected with the first, fourth and fifth light-receiving elements for creating a third tracking error signal based on the output signals from the first, fourth and fifth light-receiving elements.

5. The optical pickup device of claim 4 further including:

determination means for determining a structure of the optical recording medium including a predetermined track pitch;

and

selection means for selecting one of the first, second, and third tracking error signals in accordance with the determined structure of the optical recording medium.

6. The optical pickup device of claim 5, wherein the selection means selects the first tracking error signal when the optical recording medium is a read-only medium.

7. The optical pickup device of claim 5, wherein the selection means selects the second tracking error signal when the optical recording medium has a groove recording structure.

8. The optical pickup device of claim 5, wherein the selection means selects the third tracking error signal when the optical recording medium has a land-groove recording structure.

9. The optical pickup device of claim 1 further including a crosstalk cancellation circuit connected with the first, fourth and fifth light-receiving elements for reducing an amount of crosstalk in the output signal from the first light-receiving element and originating from signals from adjacent tracks, based on the output signals from the fourth and fifth light-receiving elements.

10. The optical pickup device of claim 1 further including an optical element for astigmatizing at least the returning light from the spot of the zero order diffracted light.

11. The optical pickup device of claim 10, wherein the optical element is a cylindrical lens positioned in an optical path of the returning light of the zero order diffracted light such that a center axis of the cylindrical lens extends at an

angle of 45° to a track extending direction on the optical recordation medium.

12. An apparatus comprising:

means for receiving a light beam from a light source to create zero order diffracted light,  $\pm$  first order diffracted light and  $\pm$  second order diffracted light;

means for focusing the zero order,  $\pm$  first order and  $\pm$  second order diffracted light on a recording surface of an optical recording medium so as to form a spot of the zero order diffracted light on a first track extending on the recording surface, spots of the  $\pm$  second order diffracted light on tracks adjacent to the first track, and spots of the  $\pm$  first order diffracted light between the spot of the zero order diffracted light and the spots of the  $\pm$  second order diffracted light; and

means having first to fifth light-receiving means, the first light-receiving means being adapted to receive returning light from the spot of the zero order diffracted light, the second and third light-receiving means being adapted to receive returning light from the spots of the  $\pm$  first order diffracted light, and the fourth and fifth light-receiving means being adapted to receive returning light from the spots of the  $\pm$  second order diffracted light, to create output signals used to prepare an error signal to drive the apparatus.

13. The apparatus of claim 12, wherein the first light-receiving means includes four independent light-receiving portions adjacent to each other and partitioned by two division lines intersecting each other perpendicularly, one of the division lines being parallel to a track extending

direction.

14. The apparatus of claim 12, wherein each of the second to fifth light-receiving means includes at least two independent light-receiving portions adjacent to each other and partitioned by a division line extending substantially parallel to a track extending direction.

15. The apparatus of claim 12 further including:

means for creating a first tracking error signal based on the output signal from the first light-receiving means;

means for creating a second tracking error signal based on the output signals from the first to third light-receiving means; and

means for creating a third tracking error signal based on the output signals from the first, fourth and fifth light-receiving means.

16. The apparatus of claim 15 further including:

determination means for determining a structure of the optical recording medium; and

selection means for selecting one of the first, second, and third tracking error signals in accordance with the determined structure of the optical recording medium.

17. The apparatus of claim 16, wherein the selection means selects the first tracking error signal if the optical recording medium is a read-only medium, selects the second tracking error signal if the optical recording medium has a groove recording structure, and selects the third tracking error signal if the optical recording medium has a land-groove recording structure.

18. The apparatus of claim 12 further including means for reducing an amount of crosstalk in the output signal from the first light-receiving means and originating from signals from adjacent tracks, based on the output signals from the fourth and fifth light-receiving means.

19. The apparatus of claim 12 further including astigmatic means for astigmatizing at least the returning light from the spot of the zero order diffracted light.

20. The apparatus of claim 19, wherein the astigmatic means is a cylindrical lens positioned in an optical path of the returning light of the zero order diffracted light such that a center axis of the cylindrical lens extends at an angle of 45° to a track extending direction.

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